Name:

at1124exam: Radicals and Squares (v819)

Question 1

Simplify the radical expressions.

$\sqrt{50}$	$\sqrt{20}$	$\sqrt{63}$
$\sqrt{5 \cdot 5 \cdot 2}$	$\sqrt{2 \cdot 2 \cdot 5}$	$\sqrt{3 \cdot 3 \cdot 7}$
$5\sqrt{2}$	$2\sqrt{5}$	$3\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$2(x+8)^2 - 6 \;=\; 66$$

First, add 6 to both sides.

$$2(x+8)^2 = 72$$

Then, divide both sides by 2.

$$(x+8)^2 = 36$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 8 = \pm 6$$

Subtract 8 from both sides.

$$x = -8 \pm 6$$

So the two solutions are $x = -2$ and $x = -14$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = -16$$

$$x^2 + 10x + 25 = -16 + 25$$
$$x^2 + 10x + 25 = 9$$
$$(x+5)^2 = 9$$
$$x + 5 = \pm 3$$
$$x = -5 \pm 3$$
$$x = -2 \quad \text{or} \quad x = -8$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 5x^2 + 30x + 41$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 5 .

$$y = 5(x^2 + 6x) + 41$$

We want a perfect square. Halve 6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 5(x^2 + 6x + 9 - 9) + 41$$

Factor the perfect-square trinomial.

$$y = 5((x+3)^2 - 9) + 41$$

Distribute the 5.

$$y = 5(x+3)^2 - 45 + 41$$

Combine the constants to get **vertex form**:

$$y = 5(x+3)^2 - 4$$

The vertex is at point $(-3, -4)$.